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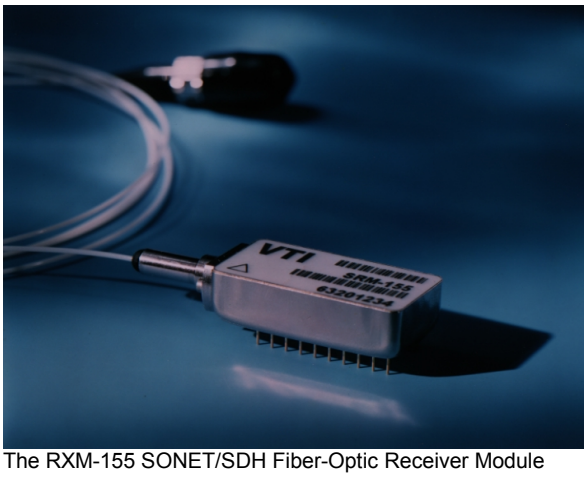
VECTRON INTERNATIONAL
A DOVER TECHNOLOGIES COMPANY

Product Data Sheet

RXM-155
SONET/SDH Fiber-Optic Receiver Module



The RXM-155 SONET/SDH Fiber-Optic Receiver Module

Features

- SONET OC-3 and SDH STM-1 Compatible
- PECL Data Outputs
- Single +5 Volt Supply
- PECL Loss of Signal Flag
- Operation at 1300 nm and 1550 nm
- -45° to +85°C Operation
- -34dBm minimum sensitivity
- Wide Dynamic Range
- Multi-Sourced 20 Pin DIL Footprint

Applications

- Telecom Receiver Applications
  Medium and Long Haul SONET/SDH @ 155 Mb/s
- High Performance Datacom Receiver Applications
  ATM @ 155 Mb/s

Description

VI's RXM-155 is an integrated fiber-optic receiver module. It is powered by a single +5v power supply and is housed in a 20 PiN DIL package.It is ideally suited for SONET OC-3, SDH STM-1 and other 155 Mb/s fiber-optic transmission applications that demand superior performance. It is available with a multi-mode fiber pigtail with either FC/PC,ST or SC connector.

Functional Overview

This highly integrated module converts a 155 Mb/s fiber-optic NRZ signal to differential PECL data outputs. A PECL flag alerts the user to a loss of signal condition when the optical input falls below an acceptable level.

A single +5 Volt supply provides bias for the module's preamplifier, and Quantizer. The photodiode may be biased with -5 Volts or Grounded. All elements are integrated into fiber-coupled 1.3" X 0.635" 20 pin DIL package. The RXM-155 footprint and pinout are industry common for ease of integration.

The optical signal is coupled through a short length of 50.0 μm multimode or single mode optical fiber to a hermetic module which encases an InGaAs PiN-photodiode and preamplifier. The PiN-photodiode converts the optical signal to an electrical current. The signal is then converted to a voltage and amplified by a low noise transimpedance amplifier.

Further gain is provided by the quantizer, which also provides a Flag output when the optical signal falls below an acceptable level.

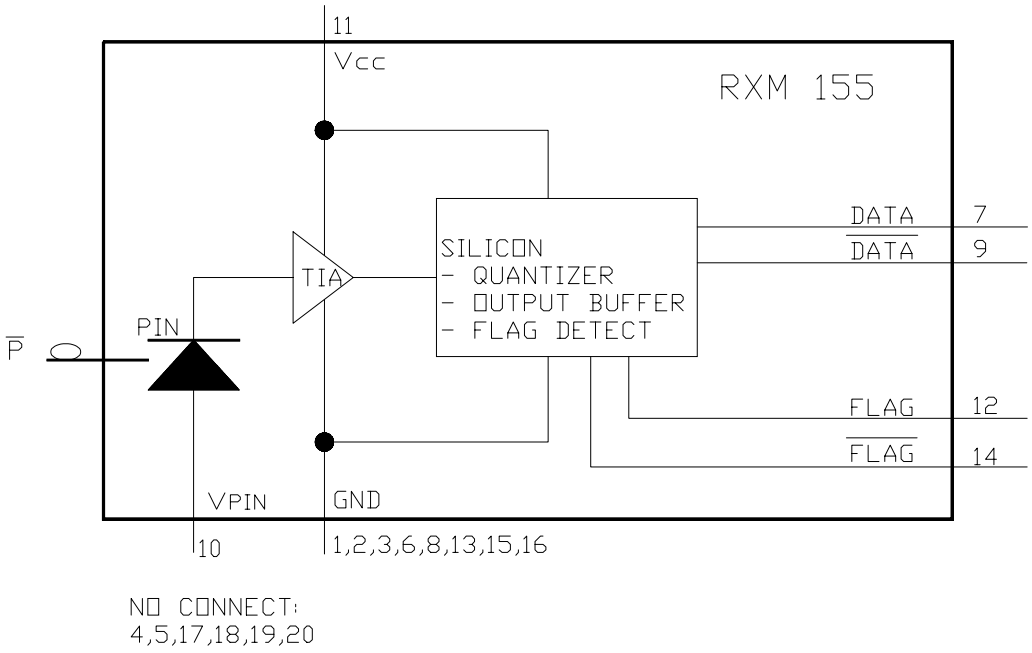


Figure 1. RXM-155 Functional Block Diagram

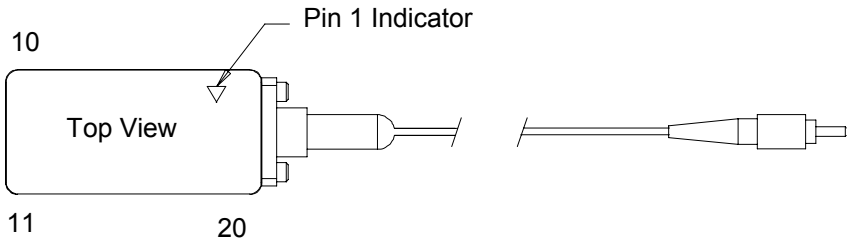


Figure 2. Pin Diagram (Top View)

Table 1. Pin Function

Pin	Symbol	Function
7	Data	PECL Data Output.
9	$\overline{\text{Data}}$	PECL Complementary Data Output.
10	V_D	Detector Anode Bias. Connect to GND or a -5V biased series resistor for received optical power monitoring.[1]
11	V_{CC}	5 Volt Supply Voltage.
12	Flag	Input Signal Level Status. This PECL output switches low when the received optical power falls below the flag threshold.
14	$\overline{\text{Flag}}$	Complementary Input Signal Status. PECL complement of Flag.
1,2,3,6,8,13,15,16	GND	Ground.
4,5,17,18,19,20	NC	No User Connection.

1. By connecting pin 10 to a -5 Volt bias through a series resistor (e.g. 1 kΩ) received optical power can be monitored as a voltage drop across the resistor.

Absolute Maximum Ratings

Absolute maximum ratings are provided here as worst case and short duration exposure conditions only. Exposure to conditions more severe than the Absolute Maximum Ratings may result in permanent damage. Exposure to conditions at the Absolute Maximum Ratings for extended periods may also adversely affect device performance or reliability. Functional operation of the device is not implied at these conditions.

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature Range	T_S	-40	85	°C
Supply Voltage	V_{CC}	0	+6	V
pin Detector Bias	V_D	-15	0	V
Lead Soldering Conditions			250/10	°C/s

Performance Characteristics

Table 3. Electrical Performance

Parameter	Symbol	Minimum	Typical	Maximum	Units
Input Signal Rate	f_O	120	155.52	175	Mb/s
Operating Temperature	T_O	-40		+85	°C
Power Supply Voltage	V_{CC}	4.5	5.0	5.5	V
pin Detector Bias Voltage (pin10)	V_D	-15	0	0	V
Power Supply Current	I_{CC}			200	mA
Data Output Levels [1]					
Low	V_{OL}	V_{CC} - 1.95		V_{CC} - 1.63	V
High	V_{OH}	V_{CC} - 1.03		V_{CC} - 0.88	V
Data Output Rise and Fall Times [2]	T_R, T_F	275	375	575	ps
Received Power Level Flag	LOS				
Decreasing Optical Power			-37		dBm
Increasing Optical Power			-35		dBm
Flag Hysteresis	Hyst		2		dB

1. Measured with a load of R_L = 50Ω to V_{CC} - 2 V. See figures 3 and 4. ECL levels are specified for dc measurement, an additional tolerance of 50 mV should be included for dynamic measurements.
2. Measured at 20% to 80% levels.

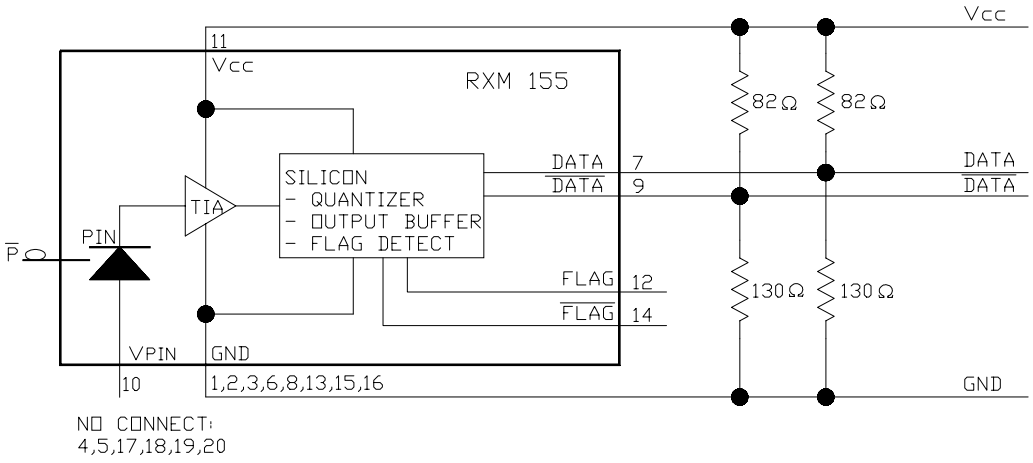


Figure 3. PECL Interface

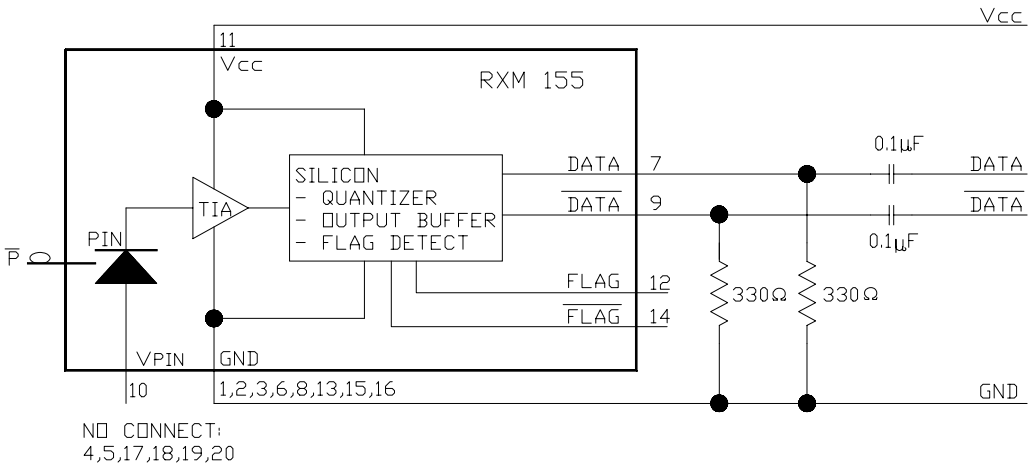


Figure 4. ECL (AC Coupled) Interface

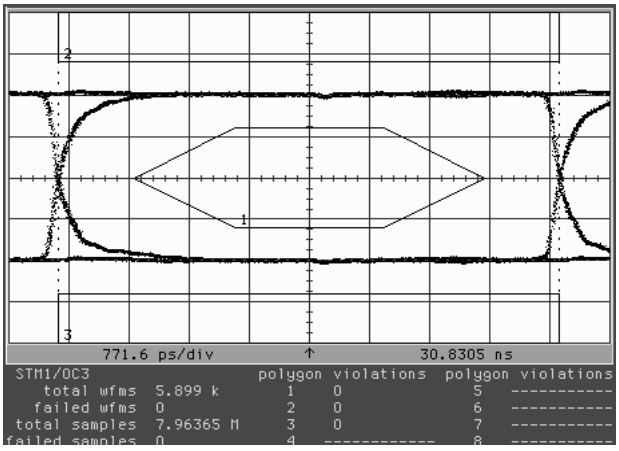


Figure 5. Typical Performance @ 155.52MHz

Table 4. Optical Performance

Parameter	Symbol	Minimum	Typical	Maximum	Units
Minimum Average Sensitivity [1]	Sens.	-34.0			dBm
Maximum Optical Input [1]	P_{MAX}			0	dBm
Input Wavelength	λ	1280		1580	nm

1. For a BER less than 1E-10. Measured using a 2^{23} - 1 pseudorandom word and a 50% average optical duty cycle and a 10 dB Extinction Ratio.

Qualification

The RXM-155 has been designed to comply with the requirements of Bellcore specifications GR-468-CORE, Reliability Assurance for Optoelectronic devices and will be subject to a complete qualification test plan to demonstrate full compliance. All of the technologies used in the assembly of the module represent standard microelectronic and optical technologies that are used in similar products, and have extensive field reliability data.
All components and technologies used in the optical receiver are backed by qualification data covering mechanical and environmental tests along with accelerated life tests. Typical tests, test conditions and sample sizes are listed below.

Table 5. Qualification Plan

Test	Test Method	Sample Size
Physical Dimensions	MIL-STD-883, Method 2016	11
Mechanical Shock	MIL-STD-883, Method2002, Test B	11
Vibration, variable frequency	MIL-STD-883, Method 2007, Test A	11
Lead Solderability	MIL-STD-883, Method 2003	22 Leeds
Lead Integrity	MIL-STD-883, Method 2004	15 Leeds
Temperature Cycling	-40°C/85°C, 300 cycles	11
High Temperature Aging	85°C under bias, 2000 hours	11
Damp Bake	85°C/85% RH/ 1000 hrs	11
Low Temperature Storage	-40°C, 168 hours	11
ESD	MIL-STD-883,Method 3015	3
Destructive Bond Pull	MIL-STD-883,Method 2011	40

Table 6. Optical Fiber Characteristics

Parameter	Minimum	Typical	Maximum	Units
Fiber Length		1000		mm
Fiber Core		50		um
Fiber Buffer		900		µm

Outline Diagram

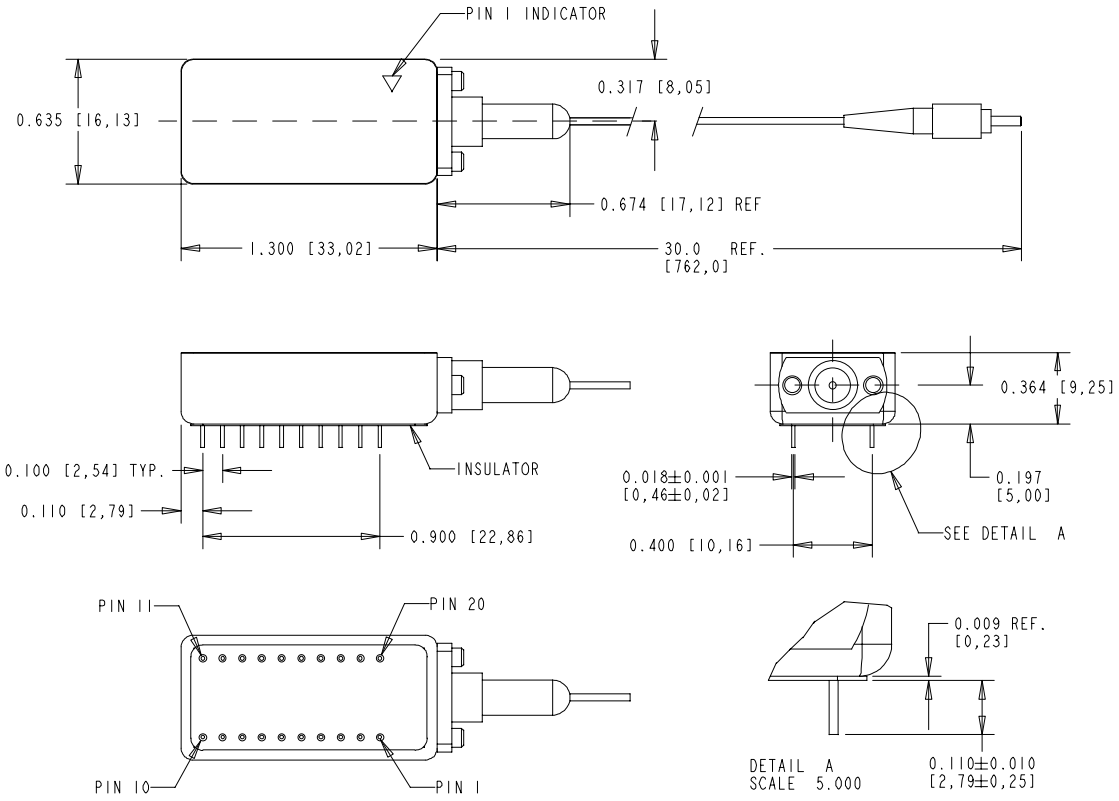


Figure 6. Outline Diagram

Ordering Information

Standard modules are built with 50um MM fiber, with an outer jacket diameter of 900um. Alternative fiber type, connector type and fiber lengths are available upon request. Contact factory for specific details.

Table 7. Part Numbers

Fiber-Optic Connector[1]	Model Number	VI Code Number
FC/PC	RXM-155A	330018265
ST	RXM-155B	330003674
SC	RXM-155C	330018276

1. Other connectors or fiber requirements are available to meet specific application requirements.

Notes:

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